Final Report for NASA grant NAG5-9235

The ADP grant NAG5-9235 entitled "A Measurement of the Non-Thermal X-Ray Emission of the Supernova Remnant RX J1713.7-3946" was used to support our analysis of the RXTE, ASCA, and ROSAT data for the supernova remnant RX J1713.7-3946 and to publicize the results of the analysis. This remnant is one of only two whose X-ray emission is dominated by non-thermal emission and that have been detected at TeV energies. Previous X-ray studies failed to find evidence of thermal X-ray emission. For the first time, we have found such evidence for emission from the center of the remnant. The results of our analysis indicate that the average density of the material into which the remnant has expanded is very low. The lack of evidence of thermal emission from the bright northwestern rim of the remnant places an extremely strong constraint on the amount of TeV emission that can be produced by the interaction of very-high energy cosmic-ray protons accelerated in the remnant with other protons in the remnant. This constraint is inconsistent with the published claim that the TeV emission from the rim is due to the decay of neutral pions produced by the collision of TeV protons with material in the remnant. We offer an alternative interpretation of the gamma-ray data which is consistent with all of the available data: the gamma-ray emission is produced by inverse Compton emission from very-high energy electrons. In summary, the grant has helped us solve two mysteries about the remnant. The results of this analysis will be published soon in the Astrophysical Journal.